BERRY PATCH ACRES ASSOCIATION (PWSNO 1090109)
SOURCE WATER ASSESSMENT REPORT

March 14, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Berry Patch Acres Association*, describes the public drinking water wells; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Berry Patch Acres Association drinking water is supplied by a single 287-foot deep well pumping from the Rathdrum Prairie Aquifer. The water system serves 14 residential connections in rural Bonner County, Idaho, about 2.4 miles north of Athol. Berry Patch Acres Association has had few water quality problems other than the presence of the volatile organic chemical (VOC) Tetrachloroethylene at concentrations below the Maximum Contaminant Level (MCL). A groundwater Susceptibility Analysis conducted by DEQ November 21, 2001 ranked the well at high risk for VOC contamination based on the system's water sampling history. Susceptibility to other classes of regulated contaminants is moderate because of natural risk factors associated with local geology.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Drinking water protection activities for Berry Patch Acres Association should emphasize strategies to eliminate introduction of volatile organic chemicals into the water. The Association needs to keep the well lot and pump house free from the use or storage of paints, solvents, petroleum products, weed killers etc. Tetrachloroethylene is a commonly used solvent and degreaser. Since improper disposal of household products is another possible source ground water contamination, the association should consider distributing educational materials about septic system care, ground water friendly automotive repair practices and similar topics.

Because 186 public water systems in Idaho draw water from the Rathdrum Prairie Aquifer, they should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. Partnerships with state and local agencies and industry groups should also be established.

Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact your regional Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR BERRY PATCH ACRES ASSOCIATION

Section 1. Introduction - Basis for Assessment

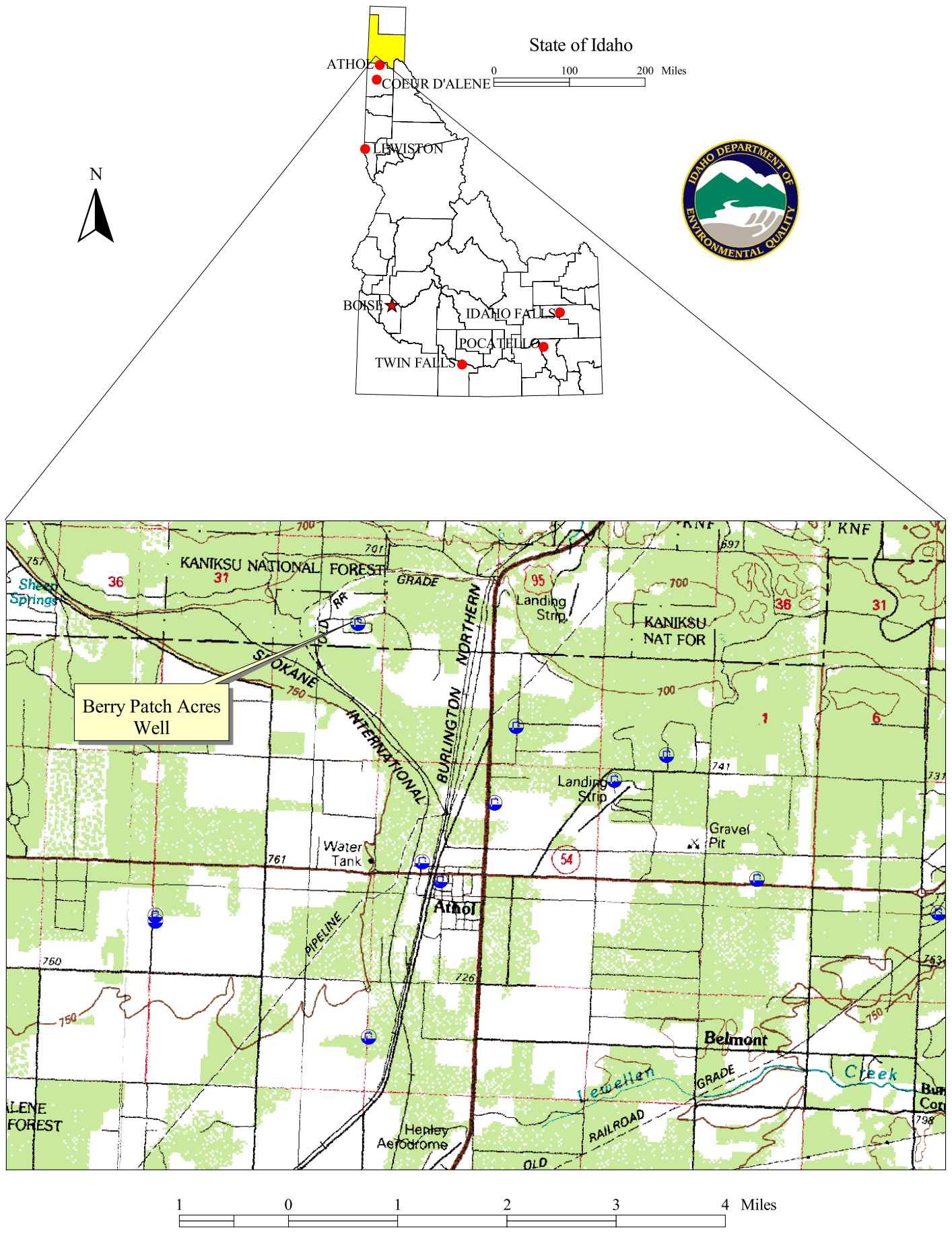
The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system. The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Berry Patch Acres



Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the well recharge area into time of travel zones indicating the number of years necessary for a particle of water to reach a well. DEQ used a refined computer model approved by the EPA to determine the time of travel (TOT) for water the Berry Patch Acres well pumps from the Rathdrum Prairie Aquifer. The computer model used data assimilated by DEQ from a variety of sources including the local well logs.

Berry Patch Acres Association serves a community of 44 people in a rural neighborhood near the boundary between Kootenai and boundary Counties (Figure 1). Drinking water for Berry Patch Acres Association customers is supplied by a 287-foot deep well producing about 50 GPM.

The delineated source water assessment area for Berry Patch Acres Association encompasses approximately 2 acres stretching north and eastward from the well. The delineation is divided into 0-3, 3-6 and 6-10 year time of travel zones.

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources within the Berry Patch Acres Association source water assessment areas through the use of computer databases and Geographic Information System maps developed by DEQ. A map showing the delineation and a table summarizing the results of the database search were then sent to system operators for review and correction during the second or enhanced phase of the inventory process

Figure 2, *Berry Patch Acres Association Delineation and Potential Contaminant Inventory* on page 7 of this report shows the location of the Berry Patch Acres Association well, and the zone of contribution DEQ delineated for it. Roads crossing the delineation boundaries appear to carry low volume local traffic only. Locations of buildings and septic systems relative to the well are not documented. The predominant land use in the recharge zone is rural residential.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

The susceptibility to contamination of all groundwater sources in Idaho is being assessed on the following factors:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet in Attachment A shows in detail how the Berry Patch Acres Association well scored.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. Lower scores imply a well that can better protect the water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent sanitary survey of the public water system. The well log for the Berry Patch Association well is on file with the Idaho Department of Water Resources. The last sanitary survey of the system was conducted in January 2000.

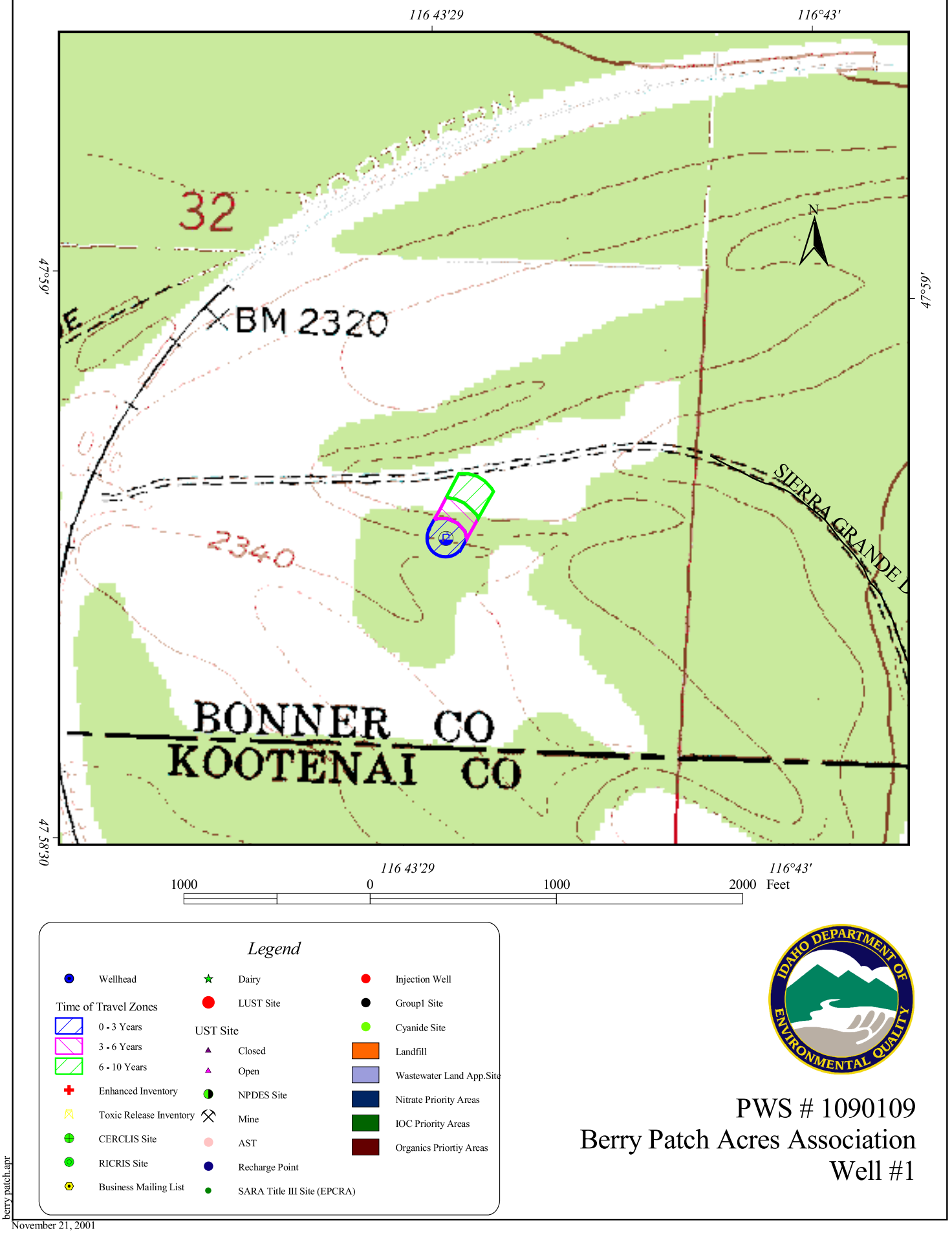
The Berry Patch Acres Association drinking water system relies on a single well extracting ground water for domestic uses. No treatment is required before the water enters the distribution system. The year 2000 sanitary survey found the system to be mostly in compliance with *Idaho Rules for Public Drinking Water Systems*. No deficiencies in well seal or wellhead maintenance were observed during the inspection.

The well is 287 feet deep and has an 8-inch steel casing that extends from 2 feet above ground to the full depth of the well. The stainless steel well screen is set from 277 to 287 feet. The well is completed at the boundary between layers of sandy gravel and clay. The surface seal depth reported on the well log, 75 feet, exceeds Idaho Department of Water Resources standards, but points were marked against the well because the seal terminates in a gravel layer typical the Rathdrum Prairie Aquifer. Table 1 summarizes construction and site characteristics for the well.

Table 1. Selected Construction Characteristics of Berry Patch Acres Association Well

Well	Total Depth (ft.)	Depth of Surface Seal (ft)	Depth of Casing (ft)	Well Screen Depth Range (ft)	Static Water Level (ft
Well #1	287	75	287	277/287	251

Figure 2. Berry Patch Acres Association Delineation and Potential Contaminant Inventory.



PWS # 1090109
Berry Patch Acres Association
Well #1

berry patch.apr
November 21, 2001

Hydrologic Sensitivity

The hydrologic sensitivity score for the Berry Patch Acres Association wells was 5 points out 6 points possible. The score reflects natural geologic conditions at the well site and in the recharge zone. The soils in the recharge zone as a whole are moderately well drained. Poorly drained to moderately well drained soils are more protective of ground water than soils that drain faster.

The depth to ground water is less than 300 feet. Sand, gravel and boulders predominate in the soil layers between the surface and the water table. There is some clay and silt mixed in with the coarser materials, but no continuous clay layer to retard the vertical transport of contaminants.

Potential Contaminant Sources and Land Use

Land use within The Berry Patch Acres Association well recharge zone is rural residential. Roads near the well and crossing the delineation boundaries appear to carry a low volume of local traffic, with little potential for spills from vehicles carrying hazardous materials or petroleum products. There are no potential contaminant sites documented inside well recharge zone boundaries.

Historic Water Quality

Berry Patch Acres Association has had few water quality problems other than the presence of the volatile organic chemical (VOC) Tetrachloroethylene at concentrations below the Maximum Contaminant Level (MCL) of 5.0 µg/l. Concentrations of Tetrachloroethylene detected in the water were: 1.4 µg/l on February 6, 2000, 0.80 µg/l on June 27, 2001 and 0.50 µg/l on August 8, 2001. Tetrachloroethylene is found in many common household products. It is used for dry cleaning and textile processing, as a chemical intermediate, and as a degreasing agent. It is also used for rubber coatings, solvent soaps, printing inks, adhesives and glues, sealants, polishes, lubricants, and silicones.

Nitrate has not been detected in water from the Berry Patch well. When the water was tested for other inorganic chemical constituents in 2000, results were as follows:

- Barium (MCL = 2.0 mg/l) 0.03 mg/l.
- Fluoride (MCL = 4.0mg/l) 0.2 mg/l.
- Sodium 2.31 mg/l.
- Sulfate 10 mg/l.

Radiological contaminants in concentrations below the MCL were present when the water was tested in 2000 and 2001.

The system is required to test monthly for bacterial contamination. Total coliform bacteria were present in an isolated distribution system sample drawn April 18, 2000.

Final Susceptibility Ranking

The Berry Patch Acres Association well was automatically ranked highly susceptible to VOC contamination because of the presence of Tetrachloroethylene in the tested well water. The well ranked moderately susceptible to synthetic organic chemical, inorganic chemical and microbial contamination. Natural risk factors associated with the geology of the Rathdrum Prairie Aquifer added the most points to the final susceptibility scores. Total scores in each category are summarized on Table 2. The complete analysis worksheet for the well is in Attachment A.

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

The final ranking categories are as follows:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

Table 2. Summary of Berry Patch Acres Susceptibility Evaluation

Cumulative Susceptibility Scores						
Well Name	System Construction	Hydrologic Sensitivity	Contaminant Inventory			
			IOC	VOC	SOC	Microbial
Well #1	2	5	0	*High	0	0
Final Susceptibility Score/Ranking						
	IOC		VOC	SOC		Microbial
Well #1	7/Moderate		*High	7/Moderate		7/Moderate

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
*High - Indicates source automatically scored as high susceptibility due to presence of a VOC or SOC; or the presence of an IOC above the maximum contaminant level in the tested drinking water, or the repeated presence of bacteria in wellhead samples.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local area. The state and local health districts have instituted enhanced protection of the ground water in the Rathdrum Prairie Aquifer because of its high use and uniquely pristine water quality. The protections are generally aquifer wide and are not aimed at zones of contribution to a specific well or water system. *The Spokane Valley-Rathdrum Prairie Atlas*, sent to water systems on the prairie when they were invited to perform an enhanced contaminant inventory, describes some of the regional protection measures.

The 186 public water systems in Idaho that draw water from the Rathdrum Prairie Aquifer should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. These types of measures could be used to protect the capture zones of a specific system or group of wells that could be put at risk from local land use changes.

While Tetrachloroethylene concentrations in the Berry Patch well appear to be declining, Berry Patch Acres Association should emphasize strategies to eliminate introduction of volatile organic chemicals and other contaminants into the water. The Association needs to keep the well lot and pump house free from the use or storage of paints, solvents, petroleum products, weed killers etc. Since improper disposal of household products is a possible source ground water contamination, the association should consider distributing educational materials about septic system care, ground water friendly automotive repair practices and similar topics. Water users can also be invited to participate in voluntary ground water protection activities like household hazardous materials collection days.

Partnerships with state and local agencies and industry groups should also be established. For instance, source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, local Soil Conservation District, and the Natural Resources Conservation Service. The local highway district should be informed about the location of the well recharge zone so they reduce or eliminate the use of dust abatement compounds or herbicides for noxious weed control in sensitive areas.

Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Division of Environmental Quality, 1994. Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho. Ground Water Quality Technical Report No. 5. Idaho Division of Environmental Quality. December 1994.

Idaho Division of Environmental Quality, 1996. Lower Payette River Agriculture Irrigation Water Return Study and Ground Water Evaluation, Payette County, Idaho. Water Quality Status Report No. 115.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Environmental Quality, 2000. City of Fruitland Wellhead Viability Project 319 Grant Final Report July 2000.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

Berry Patch Acres Association Susceptibility Analysis Worksheet

Ground Water Susceptibility

Public Water System Name : **BERRY PATCH WATER ACRES ASSN** Source: **WELL #1**

Public Water System Number : **1090109** 11/21/01 9:00:02 AM

1. System Construction		SCORE			
Drill Date	12/8/78				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	2000			
Well meets IDWR construction standards	YES	0			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	CASING YES/SEAL NO	1			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		**2**			
2. Hydrologic Sensitivity					
Soil Drainage	Moderate	1			
Vadose zone composed of gravel, fractured rock	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		**5**			
		IOC	VOC	SOC	Microbial
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		Score	Score	Score	Score
Land Use Zone 1A	RANGELAND, WOODLAND	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	TETRACHLOROETHYLENE	NO	YES	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		**0**	**0**	**0**	**0**
Cumulative Potential Contaminant / Land Use Score		**0**	**0**	**0**	**0**
4. Final Susceptibility Source Score		**7**	**7**	**7**	**7**
5. Final Well Ranking		Moderate	**High***	Moderate	Moderate